

AMENDMENT

Please amend the claims as follows:

1. (currently amended) An ultrasound probe for connection with an imaging system, the probe comprising:

an ultrasound transducer;

a releasable connector electrically connected with the ultrasound transducer and releasably connectable with an ultrasound imaging system, the releasable connector having a plurality of electrical outputs for respective signals each representing one or more different elements;

an analog-to-digital converter connected between the ultrasound transducer and the releasable connector and separate from the ultrasound imaging system and an imaging system housing;

a coaxial cable electrically connecting the ultrasound transducer to the analog-to-digital converter, the coaxial cable having a length longer than a longest dimension of a probe housing housing the ultrasound transducer; and

a connector housing connected with an end of the coaxial cable, at least part of the coaxial cable outside of the connector housing and the probe housing, and the connector housing at least partially around the releasable connector and the analog-to-digital converter, the housing spaced from the ultrasound transducer;

wherein the releasable connector mates with and is releasable from the imaging system housing, and the coaxial cable is non-releasably connected with the connector housing, the connector housing positionable against the imaging system housing when the releasable connector mates with the imaging system housing and when the releasable connector is connected for communicating from the analog-to-digital converter to the ultrasound imaging system, the connector housing having a lesser volume than the imaging system housing.

2. (original) The probe of Claim 1 wherein the ultrasound transducer comprises a multi-dimensional array of elements.

3. (cancelled)

4. (previously presented) The probe of Claim 1 wherein the ultrasound transducer comprises a plurality of transducer elements, the analog-to-digital converter electrically connected with at least a first element of the plurality of transducer elements;

further comprising a plurality of analog-to-digital converters, the plurality of analog-to-digital converters including the analog-to-digital converter electrically connected with the first element, the plurality of analog-to-digital converters electrically connected with different ones of the plurality of transducer elements.

5. (previously presented) The probe of Claim 4 further comprising:

a plurality of coaxial cables electrically connecting the plurality of transducer elements to the respectively plurality of analog-to-digital converters, the plurality of coaxial cables being fewer than the plurality of transducer elements; and

a multiplexer electrically connected between the plurality of coaxial cables and the plurality of transducer elements.

6. (previously presented) The probe of Claim 1 further comprising:

a summer connected with the analog-to-digital converter, the summer operable to combine signals from at least two elements of the ultrasound transducer, the combined signal output on one of the plurality of electrical outputs as a signal representing one of the different elements.

7. (previously presented) The probe of Claim 1 further comprising a partial beamformer operable to combine data from elements of the ultrasound transducer and output the combined data on respective ones of the plurality of electrical outputs.
8. (original) The probe of Claim 1 further comprising:
a digital processor connected between the analog-to-digital converter and one of the plurality of electrical outputs.
9. (previously presented) The probe of Claim 1 further comprising:
a switch connected between the ultrasound transducer and the analog-to-digital converter, the switch operable to bypass analog signals to one of the plurality of electrical outputs.
10. (original) The probe of Claim 1 further comprising:
a demultiplexer connected with the analog-to-digital converter; and
a serializer connected with the demultiplexer and at least one of the plurality of electrical outputs.
11. (currently amended) A system for communicating signals from a transducer for imaging, the system comprising:
a processing system comprising:
at least a part of a receive beamformer;
a system housing; and
a connector on the system housing, the connector electrically connectable with the receive beamformer; and
a detachable transducer assembly comprising:
a transducer probe at least partially housing an array of elements;

a connector housing at least partially housing an analog-to-digital converter, the connector housing physically connectable and detachable from the connector on the system housing, the connector housing abutting against the imaging system housing when mated with the imaging system housing and when connected for communicating from the analog-to-digital converter to the receive beamformer; and

at least one cable connecting the transducer probe with the connector housing, the connector housing being separate from the transducer probe housing the array and the cable extending between the transducer probe and the connector housing outside of both the connector housing and the transducer probe, the cable non-releasably connected with the connector housing and the transducer probe.

12. (original) The system of Claim 11 wherein the transducer probe is a handheld probe.

13. (original) The system of Claim 11 wherein:

the transducer probe further houses a multiplexer connected with a plurality of the elements of the array, the multiplexer operable to multiplex signals from the plurality of elements to an output; and

the connector housing further housing a demultiplexer.

14. (original) The system of Claim 11 wherein the connector housing further houses a serializer connected with the analog-to-digital converter.

15. (original) The system of Claim 11 wherein the connector housing further houses a processor, the processor operable to compress digital data responsive to output by the analog-to-digital converter.

16. (currently amended) An ultrasound probe for connection with an imaging system, the probe comprising:

an ultrasound transducer in a first housing;

a releasable connector electrically connected with the ultrasound transducer and releasably connectable with an ultrasound imaging system, the releasable connector having a plurality of electrical outputs for respective signals representing different elements; and

a processor connected between the ultrasound transducer and the releasable connector, the processor in a second housing of the releasable connector and operable to compress signals from the ultrasound transducer, the first housing non-releasably connected to the second housing by a cable, the cable longer than a longest length of both the first and second housing, the second housing positioned against the ultrasound imaging system for the releasable connection with the ultrasound imaging system and when the releasable connector is connected for communicating from the analog-to-digital converter to the ultrasound imaging system.

17. (original) The probe of Claim 16 further comprising an analog-to-digital converter between the transducer and the processor, the processor comprising a digital processor.

18. (cancelled)

19. (original) The probe of Claim 16 wherein the processor is operable to compress signals by partial beamforming.

20. (currently amended) A method for communicating signals from a transducer array to an imaging system, the method comprising:

- (a) releasably connecting a probe assembly to an imaging system;
- (b) transducing acoustic energy into electrical signals;
- (c) transmitting the electrical signals to an analog-to-digital converter;

(d) converting the electrical signals into digital data within the probe assembly;
and

(e) passing the digital data from the probe assembly to at least a part of a beamformer of the imaging system;

wherein (c) comprises transmitting the electrical signals through a cable of the probe assembly, and wherein (d) comprises converting the electrical signals into digital data within a connector housing of the probe assembly, the connector housing separate from a probe housing housing transducers for performing (b), the probe assembly of the connector housing and probe housing being connected by the cable without any releasable connections, and the connector housing spaced from the probe housing by the cable, the cable outside of the connector and probe housings, where (a) comprises abutting the connector housing against a larger housing of the imaging system.

21. (cancelled)

22. (original) The method of Claim 20 further comprising:

(f) compressing the digital data prior to (e).

23. (original) The method of Claim 20 further comprising:

(f) time division multiplexing the electrical signals prior to (c); and

(g) demultiplexing the digital data after (d) and before (e).

24. (previously presented) The probe of Claim 1 wherein transducer cables within the cable each have a constant length and same impedance.